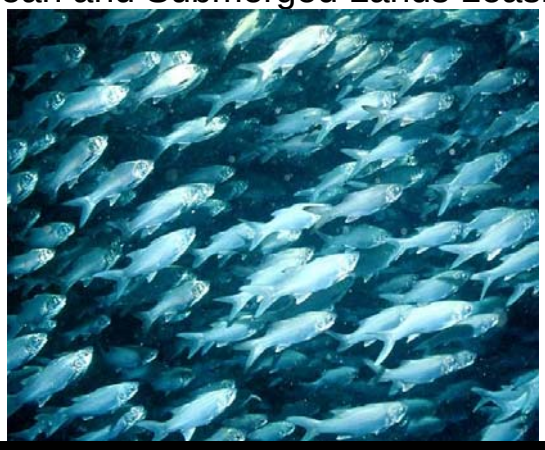
Sixth Report to the Legislature
State of Hawaii
2005 Regular Session

Implementation of Chapter 190D, Hawaii Revised Statutes
Ocean and Submerged Lands Leasing



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1.0 Introduction

Act 176, Session Laws (SLH) 1999, was enacted on July 1, 1999, allowing greater utilization of Hawaii's ocean resources for research and sustainable commercial development of open ocean aquaculture. The law requires the Department of Land and Natural Resources (DLNR), in cooperation with the Department of Agriculture (DOA), to submit a progress report to the Legislature on the implementation process prior to each regular legislative session. This Report, the sixth in the series, addresses the progress with implementing ocean leasing, as well as, highlights of related international and national activities in 2004.

2.0 International and National Activities

2.1 Ireland Meeting, "Farming the Deep Blue"

The Year 2004 was highlighted by an impressive international meeting of several hundred scientists and people interested in open ocean aquaculture development organized by the Irish Sea Fisheries Board and the Irish Marine Institute. The meeting titled, "Farming the Deep Blue," took place on October 6-7, 2004, at Limerick on Ireland's West Coast. Hawaii and United States (U.S.) interests were well represented along with all the major offshore aquaculture countries and Randy Cates of Cates International, the only commercial open ocean aquaculture farm in the U.S., was a featured speaker on submerged cage technology.

Of note, conference organizers commissioned a comprehensive report that globally assessed the potential for the further development of offshore farming of finfish. It was produced to coincide with the conference and act as a resource document to encourage discussion and debate in the large plenary session and smaller breakout sessions. Some of the more notable conclusions of the report, "Farming the Deep Blue," are highlighted here (Ryan, 2004).

<u>The Need</u>

- The case for the urgent development of offshore finfish farming is overwhelming, both from a commercial and food security perspective. The United Nations Food and Agriculture Organization (UNFAO) has carried out a study of future trends in the supply/demand balance of fishery products to 2030. On the demand side, a combination of two factors – the World's growing population, and the increasing per capita consumption of fishery products – will push the overall requirement for fishery products to a total of 180 million tons by 2030. This represents a 40% increase on the 130 million tons available in 2001 from the capture and aquaculture fisheries.

- On the supply side, the capture fishery at best will remain static, with output expected to remain at 100 million tons. It is therefore predicted that this will lead to what is becoming known as the "FAO Gap," which is simply the gulf between expected demand and expected supply from the capture industry. The conclusion is that aquaculture production will have to increase even further in order to meet demand. Production levels in 2001 of 37 million tons will therefore need to increase to approximately 80-90 million tons by 2030, or 50% of the World's total fish requirements.

- Only a portion of this required increase in aquaculture output can come from the freshwater sector or from the inshore zone of the marine. Freshwater is becoming an increasingly valuable resource as world population levels grow, aquaculture output from it will be limited as a result. A global mega trend that will also impact on this situation is that human populations are increasingly aggregating on the coastlines of the major continents. The competition for space in the coastal zone is going to intensify and this will constrict output increases from inshore fish farms.

- Thus the shortfall in production capacity will have to be made up by developing the technologies required to farm offshore. This will pave the way for aquaculture to fulfill its potential as the "Blue Revolution" in food production following on from the agricultural "Green Revolution."

- This report concentrates on offshore finfish farming as that will undoubtedly be the lead sector in offshore aquaculture development. Further, because this drive into the open ocean will, in the first instance, be based on high value carnivorous species, the report focuses on this area of marine fish farming.

- Following analysis of the figures for the marine finfish sector, the report reliably concludes that the potential increase in annual production by 2030 is 3.15 million tons, valued at $7.1 billion in the Atlantic and 3.85 million tons, worth $8.6 billion in the Pacific. There is without doubt a major market opportunity. These levels of increased production can only be achieved by developing offshore finfish farming.

<u>The Benefits</u>

- A key finding of the report is that there are major environmental benefits to be gained from a move offshore. The scientific evidence shows that benthic impacts are reduced, if not eliminated, from offshore or exposed sites. Potentially negative interactions with migratory fish stocks and any significant visual impacts are also minimized. In addition, from the farming perspective, conditions offshore are conducive to the production of healthier and faster-growing fish, with significantly lower mortality rates. Fish grown at offshore sites are also known to have firmer flesh and lower

fat levels, resulting in a higher quality end product.

- The report shows that at the current level of technology, it is feasible to envisage large scale offshore farms being developed in the near future in Class 3 (or semi-exposed) sites. It postulates that these operations will serve as the next generation technology incubators for a further move out into open ocean locations, described as Class 4 (or open ocean) type sites.

How should it be done?

- The report concludes that the multifaceted technological challenge of successfully moving finfish farming offshore is too great for any single company or indeed any single country to address. Finding the right development model for the offshore industry is proving to be elusive. The failure rate in technology trials has been high and valuable information has been lost because of the piecemeal nature of experimental work to date. The necessarily long lead time, high cost and lack of an existing end user market have discouraged many would be technology developers. The solution proposed is the formulation of a coordinated international strategy that will embrace all previous initiatives.

- The key recommendation of this report is that an international body should be formed as quickly as possible, which would exist primarily in the form of a global community operating in a high-tech virtual environment. That body would serve as an international focal point for the development of offshore aquaculture and it would seek to accelerate and galvanize the process through coordination and the provision of financial and knowledge capital.

- The report suggests that it be called: "The International Council for Offshore Aquaculture Development (ICOAD). ICOAD's mission statement might read as follows:

  ICOAD will promote and facilitate, through all means possible, the development of suitable technologies and methodologies for successful aquaculture operations in the offshore zone. The ultimate aim is the creation of a major offshore aquaculture industry, which produces a significant proportion of the total world fish requirements in an economically and environmentally sustained manner.

  The report suggests ICOAD would lead the way for aquaculture moving offshore, thus fulfilling its potential as the new "Blue Revolution" and providing a means of increasing and enhancing the ocean's bounty.

2.2 Pew Ocean Commission and U.S. Commission on Ocean Policy

The Years 2003 and 2004 were marked by the reporting to Congress of two commissions made up of distinguished scientists and public policy experts that were charged with assessing U.S. ocean policies and programs. The Pew Oceans Commission confronted fundamental environmental challenges facing our oceans, from polluted runoff fueling our coastal waters to harmful fishing practices destabilizing marine ecosystems and fishing communities. The U.S. Commission on Ocean Policy had a broader and more comprehensive charge, which included interaction with government and private stakeholders around the country, and focused on establishing findings and developing recommendations for a new comprehensive national ocean policy.

In the context of their respective missions, both Commissions considered the development of offshore and open ocean aquaculture in state waters and within the federal Exclusive Economic Zone (EEZ). Each report can be described as focusing on the "pros and cons" of the aquaculture expansion issue, i.e., Can aquaculture in state and federal waters be sustainably developed? Conclusions and recommendations of each report are briefly highlighted here.

2.2.1 Pew Oceans Commission

The Pew Oceans Commission report acknowledges that global aquaculture is growing rapidly and with capture fisheries peaking, many public and private groups point to aquaculture a the most important means to increase global fish supplies. However, though the industry has many economic and other benefits, if done without adequate environmental safeguards, environmental harm can occur. The report lists five areas of particular concern: 1) biological pollution through escaped animals; 2) fish for fish feeds or use of fish protein feed ingredients harvested from wild populations; 3) organic pollution and eutrophication from waste discharges in poorly circulated waters; 4) chemical pollution or focusing on the chemicals fish farmers can use to manage pests and disease; and 5) habitat modification or attraction of marine mammals to farm sites (Goldberg et al., 2003).

It is important to note that, "The fundamental conclusion of the Pew Oceans Commission is that this Nation needs to ensure healthy, productive, and resilient marine ecosystems for present and future generations. In the long term, economic sustainability depends on ecological sustainability (Pew Oceans Commission, 2003)." In keeping with these conclusions the Commission provided the following guidance for sustainable marine aquaculture (Pew Oceans Commission, 2003):

1. Implement a new national marine aquaculture policy based on

sound conservation principles and standards.

It was further suggested that national standards be legislated, a comprehensive permit authority established, and a lead authority should reside in an independent agency or the National Oceanic and Atmospheric Administration (NOAA). Further, placing a moratorium on expansion of marine fish farms in the U.S. EEZ was mentioned, as well as a moratorium on the use of genetically engineered species until regulatory review process is established.

2. Provide international leadership for sustainable marine aquaculture practices.

This recommendation refers to working with other nations to encourage ecologically sustainable marine aquaculture practices in the international community.

2.2.2 U.S. Commission and Ocean Policy

The U.S. Commission on Ocean Policy was established by Congress under the Oceans at 2000 (P.L. 106-256) to comprehensive review and assess America's ocean policy. After several years of study, which included 16 public meetings (including Hawaii) and 18 site visits around the country, the Commission delivered its 610-page report to the President and the Congress in September 2004. The final report had been reviewed by 37 state governors, five tribal leaders, and 800 interested stakeholders and other technical experts and contained 212 recommendations.

Marine aquaculture was covered in one of the 31 chapters of the report. It was noted that, "marine aquaculture has the potential to supply a significant part of the ever increasing domestic and global demand for seafood. However, two major concerns must be addressed: environmental problems associated with some aquaculture operations, particularly net-pen facilities, and a confusing, inconsistent array of state and federal regulations that hinder private sector investment (U.S. Commission on Ocean Policy, 2004).

To further marine aquaculture development in the U.S. the Commission recommended the following:

1. Congress should amend the National Aquaculture Act to create an Office of Sustainable Marine Aquaculture in NOAA and designate NOAA as the lead federal agency for implementing a national policy for environmentally and economically sustainable marine aquaculture.

2. Congress should increase support for expanded marine aquaculture research, development, training, extension, and technology transfer programs in NOAA. NOAA's new Office of Sustainable Marine Aquaculture should set priorities for the research and technology programs, in close collaboration with academic, business, and other stakeholders.

3. NOAA's new Office of Sustainable Marine Aquaculture should be responsible for developing a comprehensive, environmentally-sound permitting, leasing, and regulatory program for marine aquaculture.

4. The U.S. should work with the UNFAO to encourage and facilitate worldwide adherence to the aquaculture provisions of the Code of Conduct for Responsible Fisheries (U.S. Commission of Ocean Policy, 2004).

The Report also suggests that through the new Office of Sustainable Marine Aquaculture, NOAA should develop a single, multi-agency federal permitting process for the aquaculture in the EEZ that ensures that aquaculture facilities meet all applicable environmental standards and protects the sustainability and diversity of wild stocks. Additional investments in research, demonstration projects, and technical assistance can help the industry address environmental issues, conduct risk assessments, develop improved technology, select appropriate species, and create best management practices.

Under the Oceans Act of 2000, the President must submit his statement of proposals to implement or respond to the Commission's findings and recommendations to Congress within 90 days or by the end of 2004.

2.3 Pending Federal Legislation for Federal Waters

Recent reviews of the regulatory situation governing leasing of federal marine waters (3 miles to 200 miles offshore) for commercial aquaculture have indicated no clear, formal permitting or leasing process exists (Cicin-Sain et al., 2001 and Cicin-Sain et al., 2003). This situation was confirmed by the 2004 report of the U.S. Commission on Ocean Policy, which noted the lack of a regulatory framework to support offshore aquaculture development and recommended among other things that NOAA develop a comprehensive, environmentally sound permitting, leasing and regulatory program for marine aquaculture (U.S. Commission on Ocean Policy, 2004).

As other countries (e.g., Norway, Ireland, Scotland Australia, Chile and

Canada) aggressively begin moving aquaculture activities offshore and into the open ocean, the lack of a regulatory framework in the U.S. becomes glaring. In response to this growing gap, the Department of Commerce (DOC) has become more proactive in addressing marine aquaculture development issues, for example:

- DOC developed a long-term policy for expansion of the marine aquaculture industry, with objectives that seek to: a) increase the value of domestic aquaculture production from the present $900 million annually to $5 billion; b) increase the number of jobs in aquaculture from the present estimate of 180,000 to 600,000; c) develop aquaculture technologies and methods both to improve production and safeguard the environment, emphasizing where possible those technologies that employ pollution prevention; d) double the value of non-food products and services produced by aquaculture in order to increase industry diversification; e) enhance depleted wild fish stocks through aquaculture, thereby increasing the value of both commercial and recreational landings; and f) increase exports of U.S. aquaculture goods and services from the present value of $500 million annually to $2.5 billion (U.S. DOC, 1999).

- DOC developed a Code of Conduct for Responsible Aquaculture modeled after UNFAO Code of Conduct for Responsible Fisheries, to comprehensively guide the establishment of the offshore aquaculture industry in the United States (NOAA, 2003). This document, while still draft has been cleared by the President's Joint Subcommittee on Aquaculture and is going through final NOAA clearance, before adoption.

- DOC has developed a marine aquaculture research plan to address fundamental issues such as basic culture technology, pilot projects, environmental concerns, etc. It has been proposed that this expanded research effort should be conducted through in-house NOAA laboratories and public-private partnerships.

The most recent effort by NOAA addresses the institutional and regulatory constraints to offshore aquaculture by drafting the National Offshore Aquaculture Act for submission to Congress sometime in 2005. Though details of the draft Act are still under discussion, NOAA officials have indicated the legislation, which implements the recommendations of the U.S. Ocean Commission on Ocean Policy, will address the following:

- Gives DOC authority to issue offshore aquaculture permits. This authority would site permits, operating permits, include exemptions of offshore aquaculture from the Magnuson-Stevens Act and ability to streamline the permit process.

- Provide environmental and other safeguards. The Act would specifically address: environmental requirements; permit monitoring, evaluation and enforcement; authority to suspend, modify and revoke permits; bonds or other financial guarantees; and necessary consultations with Federal agencies, states, tribes, etc.

- Supports development of offshore aquaculture. The Act would encourage research and development industry partnerships and biological, social, production, and economic data collection.

- Provides funding via fees and annual appropriations. The legislation would establish an offshore aquaculture revolving fund to collect lease fees for activities to support development. The legislation would also authorize unspecified dollar amounts to support development (Chavas, 2004).

The final steps to promulgating this far-reaching legislation are: 1) interagency review and comment incorporation; 2) review by the Office of Management and Budget; 3) decision by the Administration to submit to Congress; and 4) Congressional action and signature by the President.

3.0 Hawaii Commercial Developments

3.1 Status of Existing Leases

3.1.1 Cates International Inc.

Cates International Inc. (CII) was formed in 1999 to pursue commercial open ocean aquaculture in State marine waters. The principles had considerable experience with commercial fishing, diving, boating services, and salvage, as well as business. On April 10, 2000, CII submitted all its Federal, State and County permits for a four-cage project using 28 acres of ocean two miles off Ewa Beach, Oahu to grow moi or the Pacific threadfin (Cates et al., 2001).

On March 9, 2001, approximately 12 months after DLNR accepted the application, the Board of Land and Natural Resources (BLNR) authorized a lease, the first open ocean aquaculture lease in the Nation (Sea Technology, 2001). Since the lease approval, CII has deployed and operated three Sea Station 3000 submersible cages and a fourth cage was launched in November of 2004. Production has been fairly consistent climbing to 7,000 to 10,000 pounds a week in 2004. The majority of fish were consumed by local markets, including many fine dining, “white table cloth” restaurants around Honolulu. The remainder found ready markets in the

Western States.

While 2004 was marked by considerable progress for CII, continued expansion is not without its challenges. CII has put its plans to launch a second site on hold, to concentrate on finding a suitable land site for a large-scale hatchery to support the offshore farm with sufficient supplies of fingerlings to optimally operate the cages. Support locations at reasonable cost that are at or near commercial harbors continue to be difficult to find for Hawaii's offshore aquaculture industry.

3.1.2 Black Pearls Inc.

The second pioneering company involved in offshore aquaculture development is Black Pearls Inc. (BPI) of Kailua-Kona, Hawaii. It is a cutting-edge research and development company that consults in pearl oyster hatchery development and develops commercial pearl farms around the world. Pearl oysters are grown using hanging culture techniques, where oysters seeded with pearl forming nuclei are hung in baskets from lines supported by buoys, and utilize natural ocean productivity as food. Of particular interest to marine resource managers at DLNR, BPI's native cultured pearl oysters will naturally spawn re-seed and increase depleted wild stocks of oysters at no cost to the State.

On October 5, 2000, BPI submitted all its Federal, State and County permits for a 75 acre site in the borrow pit off the Reef Runway at the Honolulu International Airport. On August 24, 2001, approximately eleven months after DLNR accepted the application, a lease was authorized by BLNR and BPI became the second lease authorized under the amended Chapter 190D, Hawaii Revised Statutes (HRS), the Ocean and Submerged Lands Leasing Law. However, prior to execution of the final lease, as a condition of the approval, an administrative rule change is necessary to remove the 75-acre site from a State designated 700-acre thrillcraft area off the Airport.

In 2004, the BPI pearl project remained on hold, awaiting the administrative rule change through action by the DLNR's Division of Boating and Ocean Recreation (DBOR). Meanwhile, BPI focused its energies on securing a lease for open ocean cage culture of fish off Kailua-Kona, Hawaii. The status of that project is described next.

3.1.3 Kona Blue Water Farms

Kona Blue Water Farms (KBWF), a wholly own subsidiary of BPI,

was formed to implement open ocean cage culture of the kahala or amberjack. Hatchery techniques have been developed by KBWF through a $1.5M federal grant from the Advanced Technology Program, DOC. Plans are to produce stocking fingerlings at the Kona hatchery and grow them out at an ocean cage site not too far from the land-based facility (PBN, 2001). Other hatchery technologies for other economically important species are also being researched at the KBWF hatchery, located within the Natural Energy Laboratory of Hawaii Authority (NELHA).

KBWF submitted their State and Federal permits separately, with the State applications going in for an 81 acre site on November 2002 and approval for a lease by BLNR occurring November 5, 2003. Federal permit approvals from the U.S. Army Corps of Engineers were obtained on May 2004, and the company was ready to begin as soon as financing was completed.

As 2004 came to a close, KBWF announced they had secured $4 million in investment to build the open ocean cage farm (Star Bulletin 10/23/04). Aspen, Colorado based Cornerstone Holdings is involved in real estate development, venture capital and portfolio management, including projects on Kauai. Cornerstone Holdings President, Tom McCloskey, was the former head of Horizon Organic Dairy, the World's largest organic dairy and he has been a long-time advocate of sustainable agriculture and aquaculture. Cage deployment should begin in early 2005.

3.2 New Interest and Progress

3.2.1 Molokai Community Group

During 2004, a community group on Molokai developed a proposal to grow moi for restocking depleted fisheries around the Island. KHM International received a three-year grant from the Administration for Native Americans (ANA) to implement the project. Conceptually, the project entails buying juvenile moi from the Oceanic Institute and growing them to stocking size in an offshore cage, either surface or submerged variety. The majority of the fish would be stocked in the ocean, while some would be grown to market size and sold to generate project operating funds.

As of this writing, KHM International is assessing their plans and options for project implementation. Consideration is being given towards finding a suitable location for placement of an offshore, submerged cage of the same type as used by CII. The process for permitting a single cage for a short-term research and demonstration project is being determined in cooperation with

DLNR, with the assistance of DOA's Aquaculture Development Program (ADP).

3.2.2 Ahi Nui Tuna Farm

The Ahi Nui Tuna Farm submitted Federal and State permit applications and a State lease request in July 2002. The project initially proposed to place floating net cages 4.5 miles northwest of Kawaihae Harbor in the western part of the Island of Hawaii. Wild caught juvenile big eye and yellow fin tuna are transported to anchored cages and grown to market size (Gima, 2002).

The total proposed site size, including the mooring system, was 216 acres and the cages would occupy 16 acres of surface water. However, due to numerous concerns raised by members of the West Hawaii Community, plans for this site were suspended by the Company. Currently, a new Environmental Assessment (EA) for a new site several miles offshore and in very deepwater is currently being prepared for eventual submission for the required permits and State lease. Further informational meetings with stakeholder groups from West Hawaii are planned.

3.2.3 Ahi Farms, Inc.

Ahi Farms, Inc. is a second company planning to grow yellow fin and big eye tuna on two sites off Waianae. The Company is proposing to establish two sites of 80 acres each that can each hold up to 18 specially built cages. Juvenile fish will be captured or purchased from fishermen and grown out to market size. Plans are to export premium product to Japan (Gomes, 2002).

As of this writing, the Company has submitted its Federal permit application and is awaiting the acceptance for processing of its State Conservation District Use Application (CDUA), with attached EA. Principles continue to meet with members of the community, concerned agencies and ocean business interests that are stakeholders for this project.

3.2.4 Pacific Ocean Ventures

Pacific Ocean Ventures (POV) was formed to pursue open ocean cage farming of moi and kahala. The Company has actively searched for a site around the State and is presently focusing on location off Maui. Technology to be employed will be similar to Cates International, namely submerged cages that will be operated totally submerged.

POV is also interested in constructing its own large-scale hatchery on Maui to supply its farm. They are actively looking for an appropriate site, but meanwhile they are building a temporary research hatchery at NELHA in Kona to begin developing broodstock holding and larval rearing capabilities.

As 2004 comes to a close, POV is in the final stages of preparing its Federal and State permit applications, EA and lease request for submission to the appropriate agencies. They have spent a great deal of time and energy meeting with all manner of stakeholders on Maui and Oahu to explain the nature of their project and gather input on their chosen site.

3.3 Status of Key Issues

3.3.1 Finding Appropriate Sites

Offshore aquaculture farms can conflict with other uses of ocean space, such as fishing or boating, if poor planning and siting decisions are made. By amending Chapter 190D, HRS, State government created a permitting/leasing process or regulatory framework for use of State marine waters for aquaculture. The process created by the amended law strives to mitigate use conflicts by: 1) requiring applicants to document the use profile for the requested site as part of the Application/EA process; and 2) notifying the public of the project, requesting written comments on the EA and holding a public hearing for direct public input. With three leases authorized and four more in the process indications are that the process does provide an adequate forum to identify and mitigate multiple use concerns for offshore projects.

Hawaii has developed a workable regulatory framework to permit individual offshore projects, but efforts are underway to improve the process in the future. ADP/DOA in cooperation with the University of Hawaii at Manoa and the Office of Planning (OP) in the Department of Business, Economic Development and Tourism (DBEDT) has carried out a pilot project to map suitable offshore aquaculture sites around the main Hawaiian Islands and put that on the State Geographic Information System (GIS). To date, a prototype map system has been formulated that is being tested by assisting in siting selected offshore projects. Further system refinements and putting the database fully accessible on line will require additional grant monies from the Federal government. Ultimately, it is hoped this system can be used to identify and designate sites for offshore aquaculture and perhaps design and locate the first commercial offshore aquaculture park in the U.S. (Young et al., 2003).

At this early stage of industry development in Hawaii, viewscape issues have not been a big concern. Farms that wish to locate surface cages within view of populated areas will have to deal with public concern through the permitting/leasing process. However, Hawaii farms have several options to avoid the issue entirely: 1) locate the farm in a remote area with little or no onshore development; 2) locate the farm far offshore where surface cages cannot be seen from the shore; or 3) utilize submerged cages which are kept submerged at all times during the production cycle. CII, who obtained the first ocean lease off Ewa Beach, was the first company in the World to operate a commercial scale, offshore farm totally submerged and has clearly demonstrated this approach is viable in Hawaii.

3.3.2 Pollution and Waste Assimilation

Two high profile issues for offshore fish farming have been the potential for ocean pollution and environmental deterioration of the sea floor under the cages. Critics cite the large volumes of fish waste that can be generated by a large fish farm and without proper flushing, it can exceed the capacity of the natural environment to assimilate and recycle the wastes. In poor water circulation areas (i.e., calm sheltered waters), water quality can deteriorate and conditions in the substrate under the cage can turn foul and anoxic.

The open ocean conditions in Hawaii are vastly different from conditions in sheltered bays and fjords. Siting of aquaculture farms in State marine waters takes place in exposed ocean conditions, where strong wind, wave and current will mix and move extremely large volumes of ocean water daily. This exposed, open ocean situation has demonstrated huge dilution potential and rapid assimilation capacity by the tropical ocean environment, which already has very low ambient nutrient concentrations. On the horizon for offshore farming is computer modeling of farm characteristics and site characteristics to quantitatively determine the carrying capacity of bays and the open ocean.

Hawaii's offshore cages will generally be sited in waters greater than 100 feet in depth and on barren sand bottoms, where very secure anchoring systems can be deployed. Maintaining sea floor quality is a concern, but through carefully controlling the rate of feeding so that very little, if any, food reaches the sea floor, impacts are manageable. Experience to date has shown that with a carefully managed feeding schedule and the large population of fish that are ever present outside the cage, uneaten food reaching the sea floor is not observed and can be easily controlled.

3.3.3 Marine Mammal Interactions

As nearshore and offshore aquaculture have expanded around the World, the concerns over potential conflicts with species protected by national and international law, particularly marine mammals such as whales, have increased. With respect to whales and dolphins, recorded conflicts with nearshore and offshore aquaculture are few. In general, responsible government management agencies have generally taken the approach of approving aquaculture projects, but requiring careful monitoring by aquaculture facilities.

Offshore aquaculture in Hawaii could encounter a number of protected species: the humpback whale, several species of dolphins, monk seals and sea turtles. Though present throughout the Hawaiian Islands, populations of these animals are not extensive or are seasonal, as in the case of whales. In particular, the humpback whale is the object of a recent joint State/Federal National Sanctuary that encompasses 1,200 square nautical miles around the main Hawaiian Islands that is subject to shared recreational and commercial use.

Concerns have been raised by the State/Federal Sanctuary managers regarding offshore aquaculture's potential impacts on whales. At this early stage of development, it is difficult to predict if there will be any significant conflicts with any protected species in the Islands. Monk seals are so sparse in the main Hawaiian Islands that interactions should be rare. Scientific evidence that offshore cages are problems for whales and dolphins is not available at this time, though empirical evidence from around the World suggest no problems will be encountered if tight mooring lines and nets are maintained.

The main issues of concern are: potential for entanglement and displacement of whales and dolphins from their normal habitats. Experience with Hawaii's first offshore lease, which is not in the Sanctuary, indicates whales and dolphins are not attracted to cages. The approach worked out in concert with responsible agencies, is to encourage siting of farms in areas thought to be less traveled by whales and dolphins and to closely monitor and report interactions with the cages, according to a plan developed with the Federal and State management agencies. In this way, all stakeholders will systematically learn to what extent offshore farming is in conflict with these protected species, if at all.

4.0 Conclusion

Chapter 190D, HRS, was amended by the Legislature and signed into law in July

of 1999, to allow Hawaii to test open ocean aquaculture leasing and significant progress has been made in the ensuing five and one half years. Shortly after the changes were signed into law, a coalition of the University of Hawaii Sea Grant Program, the Oceanic Institute and the State ADP carried out a highly successful, multi-year cage culture demonstration project, Hawaii Offshore Aquaculture Research Project (HOARP), off Ewa Beach, Oahu. While this experiment was going on, two pioneering companies, Cates International and Black Pearls, Inc., came forward and submitted the first commercial lease applications under the new law. Currently, three leases have been authorized and four others are working on preparing permit applications.

DLNR has actively worked with DOA, to clarify the regulatory and leasing process to move aquaculture offshore in environmentally and economically sustainable ways. Moreover, the agencies have emphasized close environmental monitoring so that decision-makers and the public have the information to evaluate the impacts of ocean leasing for aquaculture, as a long-term, sustainable industry for Hawaii.

As expansion continues, DOA's ADP, the State aquaculture lead agency, will continue to play the role of the facilitator for companies requesting leases and discussions with the regulatory agencies. ADP also assists companies in completing and packaging permit applications, e.g., holding initial Permit Scoping Meetings with concerned agencies. The Office of Conservation and Coastal Lands of DLNR (OCCL/DLNR) is the responsible agency for determining environmentally acceptable resource uses and the conditions for granting the CDUA permit. The Land Division of DLNR is the agency that issues and administers ocean leases. Ultimately, the BLNR decides on the issuance of the specific CDUA permit and lease on a project-by-project basis, balancing environmental concerns with economic development benefits.

The State Department of Health, Clean Water Branch (CWB) also plays a key role in offshore development by virtue of its authority to regulate effluent discharges from cages. Ocean cages are considered point source discharges and farms that grow in excess of 100,000 pounds of product a year require a National Pollution Discharge Elimination System (NPDES) permit from the CWB. To date, the CWB has shown a willingness to cooperatively work with individual open ocean aquaculture projects to formulate workable monitoring and reporting conditions for this new ocean use.

In terms of the Federal role, the U.S. Army Corps of Engineers' permitting process also determines how and where cages can be anchored in State marine waters. Further, the Corps currently is the main permitting agency for Federal marine waters, i.e., the U.S. EEZ, 3 miles to 200 miles from shore. Presently, there is no federal leasing regime for the EEZ, however the NOAA will reportedly be submitting leasing legislation to Congress in the near future.

Internationally and nationally, the realization that offshore aquaculture

development is a solution to shortfalls in global fisheries production is taking firm hold. National interest in allowing commercial aquaculture in state and federal marine waters continues to build, justified in part by the urgent need to increase domestically produced seafood supplies and foster less reliance on foreign imports. Industry participants hope the new and more intense focus will be supported with new and increased federal research funding. With the solid track record by the State, the University of Hawaii, and the private research and farming communities, Hawaii is well positioned to take advantage of this rapidly emerging sector of the U.S. aquaculture industry.

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